DISCUSSION OF THE AMENDMENT

Claims 11-12, 14-18, 20-22, 25-32, 34 and 36-54 are active in the present application. Claims 17-18, 20-22, 26, 28, 30, 34, 37, 39, 41-43, 45-47, 50, 52 and 54 are presently withdrawn from prosecution as non-elected claims. Claims 1-10, 13, 19, 23-24, 33, and 35 are canceled claims. Claim 51 is amended for matters of form to depend from Claim 11.

No new matter is added.

REMARKS

The Office asserts that the presently pending, active claims fail to comply with the written description requirement. In particular, the Office states that there is no basis for a first glass and a first substrate and a second glass and a substrate, as recited in Claim 11. The Office asserts that the specification discloses only a single glass substrate and that there is no basis for the first and second substrates being at least one of a glass substrate and a silicon substrate. Applicants draw the Office's attention to paragraphs [0007], [0014], and [0031] of the PG publication corresponding with the present application (i.e., U.S. 2005/0092466). The present specification makes it clear that the substrate of the invention may be at least one of silicon and glass. For example, paragraph [0014] discloses (underlining added):

> According to a fifth aspect of the invention, the bonding of the components or substrates where the base material is silicon or glass (heat-resistant glass with a light) decreases the effects caused by the gas.

Likewise, paragraph [0031] discloses (underlining added):

> For example, in a structure where a silicon substrate and a glass (heat-resistant glass) substrate are bonded, as described above, operation of a heat-transport device, using water as working fluid, may cause the area of the silicon substrate where the wick in the evaporator and the lines are formed to discolor, and trace gas is generated.

Further, paragraph [0030] discloses that a plurality of substrates may be bonded together. The original specification describes embodiments of the invention wherein a plurality of substrates and/or glasses are present, and further describes embodiments where the substrate may be glass and/or silicon.

Applicants thus submit the rejection is not supportable and should be withdrawn.

Applicants thank the Examiner for discussing the rejections with Applicants' U.S. representative. During the discussion that Examiner indicated that the Steele and Uchida are being used in the rejection for their respective teachings coatings may be used in heat

transport devices (e.g., coated wicks). The Examiner indicated that one of skill in the art could use Steele and Uchida as a guide for finding coatings and/or coated components that could be usefully employed in a micro heat transport device.

Applicants demonstrate below that those of ordinary skill in the art would not have any reasonable expectation that the components and/or coatings of Steele and Uchida could be used successfully in a micro heat transport device such as that of Kirshberg. Just because something works on a conventional macro scale does not mean that one can expect it to work on a micro scale. Thus, the rejection of the present claims over Steele, Uchida and Kirshberg should be withdrawn.

The Amendment filed in the present case on July 30, 2007 pointed out structural differences between the presently claimed micro heat-transport device and the conventional heat-transport devices of Steele (U.S. 5,562,949) and Uchida (U.S. 5,943,543). The July 30, 2007 Amendment also pointed out that Steele and Uchida are drawn to conventionally-sized heat transport devices and/or processes whereas Kirshberg (U.S. 2003/0066625) may describe a micro heat transport device. It is argued that Steele and Uchida are in non-analogous arts with respect to Kirshberg and thus the combination of the cited prior art is not appropriate. The Office responded by stating:

> In this case, Steele et al or Uchida et al are drawn to heat transport devices. The size of the devices is of consequence, since the mechanisms or thermodynamics of the devices are fundamental, i.e. heat transfer surfaces coated with a hydrophilic silicon dioxide to improve heat transfer. The prior art couldn't be more pertinent and analogous art.

Not only is this statement nearly incomprehensible (it appears to support Applicants' position), it merely presents the Office's conclusion without giving any consideration to Applicants' comments in the July 30 Office Action. For example, Applicants pointed out that Steele discloses a process in which a slurry of material is applied to a substrate to thereby

form a coating on the substrate. The slurry of the Steele reference includes particles that are of such large size they would clog the wick of a micro heat transport device (see especially, present Claim 52 which limits the wick to grooves having a width of about 30 μm and a depth of 100 μm, clearly incompatible with the particles present in the Steele slurry which have a particle size of greater than 14 μm).

It appears that the Office is of the opinion that the mechanisms of heat transport and thermodynamic processes of a micro heat transport device are the same as a conventionally sized device. Applicants point out that an entire field of study is devoted to microfluidics. In fact, it widely known that heat and fluid flow on a micro scale is substantially different from heat and fluid flow on a macro scale. Many factors such as surface tension, energy dissipation, capillary forces, the ability to achieve turbulent flow, and fluidic resistance (e.g., non-laminar flow), substantially change heat and fluid flow on a micro scale in comparison to a macro scale. Where the Office appears to assert that the "mechanisms or thermodynamics of the devices [e.g., conventional devices and micro devices] are fundamental" it is readily recognized by those of ordinary skill in the art that the heat and fluid flow in micro devices is significantly affected by factors that are of no consequence or of different consequence in macro heat and fluid flow devices (e.g., the conventional heat transport devices of Steele and Uchida).

The Office's combination of Steele and Uchida with Kirshberg does not take into account these fundamental differences that are known to exist between micro- and macro-heat and fluid flow. If the Office's assertion that the teachings of macro fluid flow can be applied to a micro device were correct, one would only have to miniaturize macro heat and/or macro fluid flow devices to obtain micro heat and fluid flow devices. The fact that it is not possible to carry out such miniaturization and the fact that such miniaturized devices do not exist shows that the Office's reasoning is not technically sound.

The Office defends the rejection by asserting that the test for obviousness is not whether the features of a secondary reference can be "bodily incorporated into the structure of the primary reference." Regardless, in order for a *prima facie* case of obviousness to be established, the Office must demonstrate that those of ordinary skill in the art would have some expectation of success in combining references. Here, one of ordinary skill in the art would be combining the teachings of a macro-heat and/or fluid flow device (Uchida and /or Steele) with a micro-heat and/or fluid flow device (Kirshberg). There is no evidence of record that the structures and processes of macro-heat and/or fluid flow devices are applicable on a micro scale and, in fact, as discussed above in detail, such substantial differences exist such that those of ordinary skill in the art that would not have an expectation of success in combining the references.

With regard to the coating that is applied to the glass of the presently claimed invention (i.e., see Claim 11 "formed by at least one of nitriding, oxidation, chemical vapor deposition, ion implantation, and carbonization"), the Office asserts that limitations such as "formed by oxidation" would have no patentable weight on the claimed invention. Applicants point out, however, that such processes of modifying a glass surface effect a chemical change to the surface and thus represent a structural difference between the presently claimed device and the prior art relied on by the Office.

In contrast to the claimed invention, the conventional processes of Steele include coating a substrate surface with a slurry material in order to provide different surface properties. Such coating does no cause any chemical change in the substrate, instead the substrate is merely covered with a layer of different material. In the processes used to modify the glass of the claimed invention (e.g., nitriding, ion implanting (see Claim 25) and oxidation), no coating is applied onto the substrate but instead, the surface layer of the existing material is chemically changed.

Not only does Steele fail to teach this aspect of the presently claimed invention, these limitations do in fact define structural characteristics of the claimed device that are not found in the conventional devices disclosed in Steele and Uchida and cannot be imparted to a micro device using the processes disclose in Steele and Uchida.

Thus, the Office's reliance on Steele and Uchida as a basis to modify Kirshberg is not supportable. One of ordinary skill in the art would not have a reasonable expectation that a micro heat transport device could be made by applying the processes and/or structures of Steele and Uchida to the device of Kirshberg. The Office has failed to establish a *prima facie* case of obviousness.

Applicants thus respectfully request withdrawal of the rejection and the allowance of all now-pending claims.

Respectfully submitted,

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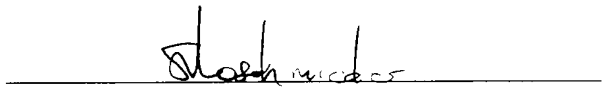

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